

A mixed bag: when are early online publications available for nomenclatural purposes?

Frank-Thorsten Krell

ICZN Commissioner; Department of Zoology, Denver Museum of Nature & Science, 2001 Colorado Boulevard, Denver, Colorado 80205–5798, U.S.A.
(e-mail: frank.krell@dmns.org)

Abstract. The 2012 Amendment to the International Code of Zoological Nomenclature allowed electronic publication for nomenclatural purposes, but it neither explicitly dealt with electronic versions published or posted online before being integrated into a journal issue, nor did it define what a preliminary version is. This has resulted in controversy as to whether electronic ‘pre-publications’ are available for the purposes of zoological nomenclature. Here I propose a definition of ‘preliminary version’ in line with publishers’ NISO guidelines. The nomenclaturally relevant version is the *Version of Record* which is the final, immutable, published version. All versions of an article previous to the *Version of Record* are preliminary and not published for the purposes of zoological nomenclature. The immutability of the *Version of Record* refers only to content. Bibliographical metadata (volume, issue and page numbers) are not considered content; when those get added or changed with the inclusion of a document into a journal issue, the content of the document does not change, hence the version remains the same: the *Version of Record*. Following those guidelines, the *Version of Record* is available for nomenclatural purposes even if the page numbers later change. The online ‘pre-publication’ models of the major publishers are analysed as to which are available for zoological nomenclature. Electronic supplements should not contain nomenclaturally relevant information as they generally are neither immutable, nor permanent, nor published in the sense of the Code.

Keywords. Electronic publishing; nomenclature; preliminary version; scientific publishing; *Version of Record*.

In 2012, following an extended public debate, the International Commission on Zoological Nomenclature allowed electronic-only publication for nomenclatural purposes by means of an Amendment of the International Code on Zoological Nomenclature (ICZN, 2012). Since the Commission was dealing with a fundamentally different way of publishing, the Amendment could only be a first attempt to regulate this relatively unknown territory comprehensively; it is a test run to be refined for the next edition of the Code.

Unfortunately, the Amendment fails to explicitly deal with the status of works that are posted or published online before their inclusion in a journal issue. Almost all journals of all major publishers follow this publication model. With the overwhelming majority of journal usages having drifted to the electronic side (Williams et al., 2010; Duriez, 2013), readers treat electronic publications as available information, disregarding the formality of whether papers are included in journal issues or not.

The nomenclatural status of those ‘electronic pre-publications’ was discussed early on, particularly during a meeting with publishers in 2011 in London (Anonymous, 2011), but at the time the topic was considered not important enough to be specifically dealt with in the Amendment, and was neither mentioned in the report of that meeting, nor in a later statement of the Commission (ICZN, 2014). This omission has understandably led to uncertainties, irritation and confusion ever since (e.g. Dubois et al., 2013, 2015; Frost, 2014).

Requirements for availability of electronic publications for nomenclatural purposes

As determined by the Amendment to the Code (ICZN, 2012) and detailed by Krell (2013), the criteria for electronic publication for the purposes of zoological nomenclature are:

- (1) wide accessibility;
- (2) issued for the permanent scientific record (online posting for a limited time is not accepted);
- (3) fixed content and layout (e.g. a protected PDF file, not an editable Word file);
- (4) date of publication must be stated in the work itself (i.e. paper or book); a note on the journal’s webpage is not sufficient;
- (5) work (i.e. a paper or a book) must be registered in ZooBank, the Official Registry of Zoological Nomenclature (<http://zoobank.org>), and contain evidence that such registration took place (e.g. exact date of registration or/and registration number); registration of new animal names is not mandatory, but encouraged (Rosenberg et al., 2012);
- (6) ZooBank registration entry must give the name and internet address of an organization other than the publisher that is intended to permanently archive the work in a manner that preserves content and layout, and is capable of doing so (this does not need to be stated in the published work itself; such archives are currently Bioline International, Biotaxa, British Library online archive, CLOCKSS, Harvard Digital Repository Service, Hathitrust, LOCKSS, National Digital Heritage Archive of the National Library of New Zealand, Portico[®], PubMedCentral[®], Virginia State Publications Depository Program, and Zenodo);
- (7) ZooBank registration entry must contain the ISBN or ISSN of the work.

ZooBank registration alone is not sufficient to establish availability. Both available and unavailable names can be registered in ZooBank. Later on, they will be flagged as such, but currently they are not.

What is *not* available for nomenclatural purposes?

There is continuing ambiguity and controversy over the validity of nomenclatural acts published in online publications not yet included in a journal issue (often called ‘online pre-publications’). Confusion arises from the missing definition of the term ‘preliminary’ or ‘preliminary version’ in the Amendment as Dubois et al. (2015, in this issue) rightfully criticize.

The amended Code (ICZN, 2012) states:

Article 9. What does not constitute published work. . . . none of the following constitutes published work within the meaning of the Code: Article 9.9.

preliminary versions of works accessible electronically in advance of publication (see Article 21.8.3);

and

Article 21.8. Advance distribution of separates and preprints.

Article 21.8.3. Some works are accessible online in preliminary versions before the publication date of the final version. Such advance electronic access does not advance the date of publication of a work, as preliminary versions are not published (Article 9.9).

Given the bewildering variety of publishing models and policies publishers have established, recognizing an online version as ‘preliminary’ is not straightforward, particularly if ‘preliminary’ remains undefined. To define ‘preliminary’ in an applicable way that avoids misunderstandings and acknowledges current publication practices we need to consider the common guidelines most publishers follow. These are the NISO/ALPSP Recommendations.

NISO/ALPSP Recommendations, the ‘Code’ for professional publishers: What is the *Version of Record*?

The question of the status of electronic versions posted or published online before the publication of the accompanying paper version has been discussed by publishers for over a decade (Frankel et al., 2000; Carpenter, 2006). It was resolved in 2008 by the Journal Article Versions Technical Working Group of the National Information Standards Organization in partnership with the Association of Learned and Professional Society Publishers issuing *Recommendations on Journal Article Versions* (NISO/ALPSP Journal Article Versions (JAV) Technical Working Group, 2008; Morgan, 2008). These *Recommendations* are considered the ‘Code’ in the academic publishing world and define article versions at different stages of production: *Author’s Original*, *Submitted Manuscript Under Review*, *Accepted Manuscript*, *Proof*, *Version of Record*, *Corrected Version of Record*, and *Enhanced Version of Record*. For the purposes of zoological nomenclature, only the immutable, final version is relevant. All versions from *Author’s Original* to *Proof* are unavailable and considered unpublished. If they appear online, they are *posted*, not published.

What is the *Version of Record*? Is it the final version published online before integration into a journal issue, i.e. without final bibliographical details (final page numbering, volume and issue number)? Or is it the final version as soon as it is integrated into a journal issue and has received its final bibliographical details? The answer is: both! Both are one and the same version, the *Version of Record*. How can this be?

The NISO recommendations state clearly that bibliographical details, namely pagination (= page numbering) and volume/issue number, are not part of the *content* of a paper and do not change the version of an article. They are bibliographical metadata. With the integration of a final version into a journal issue, its content and layout stay the same; they are just presented in a different context. This *Version of Record* is archived, whereby it does not matter with which bibliographical details it is archived. If the content of the early electronic version is immutable, apart from

bibliographical metadata, then this early electronic version is the *Version of Record* following NISO/ALPSP Recommendations:

Version of Record

Definition: A fixed version of a journal article that has been made available by any organization that acts as a publisher by formally and exclusively declaring the article ‘published’. This includes any ‘early release’ article that is formally identified as being published even before the compilation of a volume issue and assignment of associated metadata, as long as it is citable via some permanent identifier(s). This does not include any ‘early release’ article that has not yet been ‘fixed’ by processes that are still to be applied, such as copy-editing, proof corrections, layout, and typesetting.

Notes:

- (1) Version of Record (VoR) is also known as the definitive, authorized, formal, or published version, although these terms may not be synonymous.
- (2) Many publishers today have adopted the practice of posting articles online prior to printing them and/or prior to compiling them in a particular issue. Some are evolving new ways to cite such articles. These ‘early release’ articles are usually AMs, Proofs, or VoRs. The fact that an ‘early release’ article may be used to establish precedence does not ipso facto make it a VoR. The assignment of a DOI does not ipso facto make it a VoR. It is a VoR if its content has been fixed by all formal publishing processes save those necessary to create a compiled issue and the publisher declares it to be formally published; it is a VoR even in the absence of traditional citation data added later when it is assembled within an issue and volume of a particular journal. As long as some permanent citation identifier(s) is provided, it is a publisher decision whether to declare the article formally published without issue assignment and pagination [here in the sense of page numbering – FTK], but once so declared, the VoR label applies. Publishers should take extra care to correctly label their ‘early release’ articles. The use of the term ‘posted’ rather than ‘published’ is recommended when the ‘early release’ article is not yet a VoR.

While differing page numbering is a short term problem for exact cataloguing – as long as the final page numbering has yet to be determined – it is not a problem for the Code, since pagination is not regulated. Pages or pagination are mentioned in only two Recommendations of the Code (Rec. 21E and Rec. 69A.10) and not in any mandatory part of the Code. Citations of page numbers are simply a finding aid. As long as journal issues are compiled, the preliminary page numbering exists for only a short time whereas the final page numbering persists in perpetuity. For practical reasons, I suggest to cite the final page numbers whenever available. The final pagination is the most practical finding aid.

Corrected Version of Record

While the *Version of Record* cannot be changed, it can be corrected to become a *Corrected Version of Record*, according to NISO recommendations. This is defined as:

A version of the *Version of Record* of a journal article in which errors in the VoR have been corrected. The errors may be author errors, publisher errors, or other processing errors.

NISO recommends:

It should contain a note to the effect that this version is based on the VoR and was altered by X on date Y, and provide a pointer to the Version of Record. Even in the case of a true Corrected [...] Version of Record, we recommend that the accompanying metadata specify who has made the update (with the default being the publisher), what was changed, and a link to the original Version of Record.

If these recommendations are followed, then the Corrected Version of Record is equivalent to a Corrigendum as allowed by the Code's Glossary (ICZN, 1999):

corrigendum (*pl. corrigenda*), *n.* A note published by an author, editor, or publisher of a work, expressly to cite one or more errors or omissions in that work together with their correction.

If publishers allow silently replacing the *Version of Record* by a *Corrected Version of Record* without marking it as such and without maintaining access to the original *Version of Record*, then the early electronic versions of such publishers are to be considered unavailable for the purposes of zoological nomenclature. Policing is difficult, but deliberately deceptive publishing policies are certainly very rare and not to be found with reputable publishers.

Recommendation for publishers

Works (articles, books) containing nomenclatural acts (species descriptions, replacement names, type designations, etc.) are semi-legal documents (Minelli, 2003) that cannot be changed. What might seem appropriate in 'normal' scientific papers (e.g. Mosley, 2011), namely by simply replacing the defective *Version of Record* by a *Corrected Version of Record*, is not admissible for nomenclaturally relevant works. The change has to be documented as required by the Code, Article 33.2. This corresponds to the NISO recommendations. If a *Corrected Version of Record* is issued, the original *Version of Record* needs to remain published, accessible, and archived. An alternative, probably preferable procedure would be issuing a *Corrigendum*. If this *Corrigendum* contains content required for availability of nomenclatural acts included in the original article, those acts should be available from the publication date of the *Corrigendum* (e.g. Langer et al., 2014).

Enhanced Version of Record

An *Enhanced Version of Record* is a version of record updated or enhanced by supplementary material. If the publisher applies the recommendations for *Corrected Versions of Record* to *Enhanced Versions of Record*, then the original *Version of Record* would be still available and would remain the nomenclaturally relevant document. The *Enhanced Version of Record* would be considered a new publication for the purposes of zoological nomenclature. If a publisher allows replacing *Versions of Record* by *Enhanced Versions of Record*, the electronic outlets (journals, serials) concerned would not be suitable for publishing nomenclatural acts.

Recommendation for publishers

Avoid *Enhanced Versions of Record* for taxonomic papers or any papers with possible nomenclaturally relevant content. If they seem necessary or desirable, maintain and archive the original *Version of Record* in parallel and clearly indicated.

Note on Retractions

Recently, a botanical paper describing a new species in the *Nordic Journal of Botany*, a Wiley journal, was retracted because the species turned out to be a synonym (Anonymous, 2014; Mattapha et al., 2013). While this particular case does not affect zoological nomenclature, the occurrence is of concern. Retracting a paper containing zoological nomenclatural acts would be ill-advised because the Code does not provide a mechanism to deal with a published paper that is supposed to no longer exist. As soon as it is published fulfilling all criteria for availability, a paper and the nomenclatural acts that it contains are available in perpetuity (unless later deemed to be unavailable by the ICZN's plenary power). To retract a paper containing nomenclatural acts a Case should be submitted to the Commission to apply its plenary power to declare those acts and the paper unavailable. However, there is no reason for retracting a publication on the grounds of a simple synonymy. This is an inappropriate over-reaction that causes confusion.

Practices of major publishers

The publication models of major publishers for early online releases are discussed below in terms of their availability for the purposes of zoological nomenclature. Publishers are invited to consult with the ICZN if they want to reinsure that their publication policies are or become Code-compliant.

BioMedCentral's Provisional PDFs – unavailable

It goes without saying that so-called Provisional PDFs of BMC journals are unavailable for nomenclatural purposes. They are PDFs created from accepted manuscripts, but are not formally typeset. Their layout will change and production errors can be corrected (<http://www.biomedcentral.com/authors/authorfaq/available>; accessed 2 Feb. 2015). They are considered to be 'posted' rather than 'published' in NISO terminology (NISO/ALPSP JAV Technical Working Group, 2008). Their posting date carries over to the *Version of Record* and is stated after 'Published:' or 'Published online:' near the end of the article before the References section in this final version. Note that this is not the publication date of the *Version of Record* and is irrelevant for nomenclatural purposes. The publication date of the final version is not revealed beyond the year (in the header, to be precise). As they are lacking specific information on the publication date of such available articles, all of them, by default, need to be dated 31 December of the year in which they were published unless additional information proves an earlier publication date. Article 21.3. of the Code (ICZN, 1999) determines:

Date incompletely specified. If the day of publication is not specified in a work, the earliest day on which the work is demonstrated to be in existence as a published work is to be adopted as the date of publication, but in the absence of such evidence the date to be adopted is

21.3.1. the last day of the month, when month and year, but not day, are specified or demonstrated, or

21.3.2. the last day of the year when only the year is specified or demonstrated.

I had stressed earlier (Krell, 2013) that publishers need to state the publication date of the final version (*Version of Record*) in the publication, not a posting date of a previous version. BioMedCentral is aware of the problem and has put a solution in place: All taxonomic manuscripts will only be published in ‘final version’ from January 2015 (Elizabeth Moylan, Senior Editor Research Integrity, pers. comm., Jan. 2015), hence from 2015 the stated publication date is the priority-relevant date of the *Version of Record* in taxonomic papers published by BioMedCentral.

Brill’s Advance Articles – available

Brill’s webpage does not reveal whether their Advance Articles are immutable or can still be changed (<http://www.brill.com/products/journals/advance-article-publication>, accessed 2 Feb. 2015), but I received confirmation from the publisher that all Advance Articles are the *Version of Record* (Michiel Thijssen, Senior Acquisitions Editor, Biology and History of Science, Brill, pers. comm. Dec. 2014/Jan. 2015), the content of which cannot be changed. All changes to the content of *Versions of Record* will be published as Errata or Corrigenda. Brill’s Advance Articles are available for the purposes of zoological nomenclature.

Cambridge University Press’s FirstView – available

Cambridge publishes articles ‘as soon as they are ready for publication’ as FirstView articles in advance of journal issue compilation. From Cambridge’s webpages it is unclear whether those FirstView articles are final and immutable (<http://journals.cambridge.org/action/help?pageId=1768>, accessed 2 Feb. 2015), but I received confirmation from the publisher that such articles are the immutable *Version of Record* (Anne Harvey, Publishing Editor, STM Journals at Cambridge University Press, pers. comm. Dec. 2014). Cambridge’s FirstView articles are available for the purposes of zoological nomenclature. I also received confirmation that Cambridge journals containing nomenclaturally relevant content will not post ‘Accepted Manuscripts’ (i.e. provisional versions before copy editing and proofing).

Elsevier’s Articles in Press – unavailable

Elsevier states that ‘Articles in Press are accepted, peer reviewed articles that are not yet assigned to an [sic] volumes/issues, but are citable using DOI’. Articles in Press can be ‘accepted manuscripts,’ ‘uncorrected proofs,’ or ‘corrected proofs.’ It is obvious that the first two categories are unavailable for nomenclatural purposes for their content can easily change. Corrected Proofs are ‘articles that contain the authors’ corrections. Final citation details, e.g. volume and/or issue number, publication year and page numbers, still need to be added *and the text might change before final publication*’ [emphasis mine; text from the webpage of *Zoologischer Anzeiger* at <http://www.sciencedirect.com/science/journal/aip/00445231#FCANote>, accessed 2 Feb. 2015, being identical for all Elsevier journals I checked]. In my own experience, this change can include potentially nomenclaturally relevant information.

I recently requested the addition of my institution to be mentioned as a repository in corrected proofs of a paper of a colleague and succeeded. The paper did not contain nomenclatural acts, but serves as an example for Elsevier's publication policies. Since corrected proofs in Elsevier journals are not immutable, they are not to be considered the *Version of Record* and are unavailable for nomenclatural purposes. Therefore, the online publication date is irrelevant for nomenclatural purposes. Note: In the *Version of Record* of Elsevier articles, only the online publication date is stated, but not the exact publication date of the *Version of Record* beyond the year ('The date an article was first made available online will be carried over'). As they are lacking specific information on the publication date of such available articles, all of them, by default, need to be dated 31 December of the year in which they were published unless additional information proves an earlier publication date (Code Article 21.3.).

Oxford University Press's Advance Access – unavailable

Oxford Journals publish under their Advance Access scheme accepted manuscripts and corrected proofs. Articles of the first category will change in content and layout and are unavailable for nomenclatural purposes. From Oxford's webpages, it is unclear whether the corrected proofs are immutable or can still be changed (<http://sysbio.oxfordjournals.org/papfaq>; accessed 2 Feb. 2015), but I received confirmation from the publisher that content of Advance Access versions can be corrected. While this is the exception, grievous errors can be rectified (Adrienne Loggins, Senior Production Editor, Oxford Journals, pers. comm. Dec. 2014). Such corrections can include nomenclaturally relevant information. Therefore Advance Access articles are unavailable for the purposes of zoological nomenclature. As soon as articles are published in an issue, they are immutable and become the *Version of Record*. Nomenclatural availability is established by the version included in a journal issue.

Pensoft journals' electronic version – available

Pensoft publishes *ZooKeys* and a still small, but increasing number of nomenclaturally relevant journals. Next to *Zootaxa*, *ZooKeys* is one of the journals publishing the most new taxon names in zoology (Erwin et al., 2012). Originally *ZooKeys* had published identical electronic and hardcopy versions simultaneously ('on the same date', <http://www.pensoft.net/journals/zookeys/about/Editorial%20Policies#Editorial%20Policies>, accessed 2 February 2015). With the ratification of the Amendment, this practice is now changing: *ZooKeys* occasionally published electronic versions in advance to paper publication and will increasingly do so. Pensoft's other journals also publish electronic versions first. These electronic versions are always final and immutable (*Version of Record*) (Lyubomir Penev, pers. comm. Feb. 2014), hence available for the purposes of zoological nomenclature.

Springer's Online First – available

Springer does not publish articles before the proofs are corrected and finalized: 'Once the initial proof has been corrected and finalized, the article is ready for Online First publication. The article will be forwarded for online publication on SpringerLink in a week's time after the receipt of corrections. Please note: *After the article's online*

publication on SpringerLink, no corrections (including the order of the authors' names) can be made. Changes can only be made in the form of an Erratum, which will be hyperlinked to the article' (emphasis mine; text from Springer Helpdesk at <http://www.springer.com/authors/journal+authors/helpdesk?SGWID=0-1723213-12-817311-0>, accessed 2 Feb. 2015). Since Springer disallows corrections after Online First publication, Online First papers are the *Version of Record* and are available for nomenclatural purposes.

Taylor & Francis's 'Latest articles' – available, apart from 'Accepted Manuscripts Online'

Taylor & Francis generally publish corrected and finalized proofs as their 'Latest articles'. 'For most journals, accepted articles are copy-edited, typeset, proofed, and corrected, creating the VoR. The VoR is then published online in the journal's 'Latest articles' list' (<http://journalauthors.tandf.co.uk/publication/rapidonlinepublication.asp>, accessed 2 Feb. 2015). 'An article published by a Taylor & Francis journal constitutes the Version of Scholarly Record, the final, definitive, and citable version, and includes: (a) the accepted manuscript in its final form, including the abstract, text, bibliography, and all accompanying tables, illustrations, data; and (b) any supplemental material. We frequently publish Version of Scholarly Record articles in electronic form ahead of allocation to a given issue. It is our policy (in common with other publishers) not to amend or alter this published Version of Scholarly Record. [...] We publish corrections to the Version of Scholarly Record as errata or corrigenda [...] if there is a serious error, for example with regard to scientific accuracy, or if your reputation or that of the journal would be affected.' Since Taylor & Francis do not allow change to the content of the *Version of Record*, such 'Latest articles' are available for nomenclatural purposes.

Only selected journals of this publisher offer 'the Accepted Manuscript Online (AM) feature, whereby the final, accepted (but unedited and uncorrected) manuscript is posted online [...]. The posted file is clearly identified as an unedited manuscript that has been accepted for publication. Copy-editing, typesetting, and review of the resulting proof are then undertaken on this manuscript before final publication of the Version of Scholarly Record (VoR)' (<http://journalauthors.tandf.co.uk/publication/rapidonlinepublication.asp>, accessed 2 February 2015). Such manuscripts are not available for nomenclatural purposes. Since they are 'clearly identified as an unedited manuscript', the Accepted Manuscript Online feature should not cause any confusion.

Wiley's Early View – available

Wiley publishes papers after their proofs were corrected and finalized. It is true that the publisher's webpage is silent as to whether such papers can be changed (<http://olabout.wiley.com/WileyCDA/Section/id-404512.html#ev>, accessed 2 Feb. 2015), but we have recently clarified in an Opinion article for the Wiley journal *Systematic Entomology* (Cranston et al., 2015), that the content of Early View articles is immutable. Such articles are the *Version of Record*. Any changes to content of this version are dealt with by errata or corrigenda. Wiley makes an effort to add explicit notes such as '[Version of Record, published online day month year]' to papers with nomenclaturally relevant content, although this is not done in every such paper.

When the article is integrated into a journal issue, this text changes to ‘First published online day month year.’ Wiley Early View papers are the *Version of Record* with immutable content and are available for nomenclatural purposes.

Some Wiley journals, such as the *Journal of Animal Ecology*, post ‘Accepted Articles’ with the disclaimer ‘This article has been accepted for publication and undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the *Version of Record*.’ (e.g., <http://onlinelibrary.wiley.com/doi/10.1111/1365-2656.12347/abstract>; accessed 2 Feb. 2015; with publication of the *Version of Record* the disclaimer will disappear). Accepted Articles are not immutable, hence unavailable for the purposes of zoological nomenclature.

Zootaxa electronic version – available

Zootaxa, a mega-journal that publishes about a quarter of all new zoological names, had originally issued the electronic and paper versions of an article concurrently (Zhang, 2006). With the ratification of the Amendment (ICZN, 2012), the journal has changed this practice for economic reasons. Now, with the ratification of the Amendment, the electronic version can be published earlier than the paper version and is the nomenclaturally relevant version, being fully Code-compliant as explained by Zhang (2014). Print and electronic versions are produced from the same PDFs. The publication date given in either version is the date of online publication as this is the date of the first edition that is Code-compliant (Zhang, in litt. 2014).

The problem of electronic supplements

With abandoning paper, journals might decide to integrate supplementary material into the main article. However, some purely electronic journals, such as the new *Royal Society Open Science*, decided to accommodate electronic supplements that are not part of the main work. Electronic supplements are generally not subject to the same mechanisms of maintenance and archiving as the main articles. They come in all sorts of file formats which will not get migrated if software changes and are generally not archived at all. Authors and editors should avoid including nomenclaturally relevant information in electronic supplements. Electronic supplements are to be considered unavailable for the purposes of zoological nomenclature.

Nevertheless, editors let mandatory nomenclatural information slip out of the *Version of Record* of the paper and into electronic supplements. A recent example is the paper by Al Kathib et al. (2014) in *Systematic Entomology* including the description of eleven new species. Although Article 16.4.2 (ICZN, 1999) requires a statement of ‘name and location’ of the repository of the holotype, only the codens of the repositories are given in the paper. The holotypes of eight new species are in MNHG, two in NHRS, and one in AICF. While some might know what these codens mean, it is debatable if unresolved codens fulfil the requirements of Article 16.4.2. The explanation of the codens is posted as an electronic supplement. To save about 15 printed lines in an article of 57 printed pages, the journal has risked the availability of eleven new species names. This case is still unresolved. Another case occurred in the electronic-only journal *Royal Society Open Science*: A description of a new dinosaur (Langer et al., 2014a) lacked several mandatory components, including name and location of the repository of the holotype which also was to be found in an

electronic supplement. This case was resolved by the publication of an Addendum (Langer et al., 2014b), being a 'corrigendum' in the sense of the Glossary of the Code, containing the missing information and making the name available with the effective date of publication of this corrigendum.

Electronic supplements can easily cause problems for taxonomic papers and should be avoided or at least be checked for contents relating to any nomenclatural acts proposed in the paper.

Recommendation for publishers

In purely electronic publications, avoid electronic supplements. Make them supplements included in the work itself so that they become part of the *Version of Record* and enjoy the same permanency through archiving. Journals with a print version, which might consider electronic supplements necessary, are advised not to include any Code-regulated information in those supplements.

The current problems will largely go away, but not overnight

With increasing dominance of online publishing over paper in terms of distribution and usage, it becomes less important to compile articles into issues and volumes. In fact, ever more journals are transitioning to a different publishing model called article-based publishing (Elsevier; <http://www.elsevier.com/journal-authors/article-based-publishing>), continuous article publishing (Springer, e.g. Thatje, 2014), rolling volumes (Cirasella & Bowdoin, 2013) or just continuous publication (Duriez, 2013). Under this model, the *Version of Record* of articles will be published as soon as it is produced and fixed, i.e. typeset and corrected. In general each article has its own pagination and an article number that is commonly cited instead of the pagination (Öchsner 2013: 69). This provides the opportunity to use the final citation of an article from the start (Anderton & Harvey, 2013). No page numbers need to change, no issue and volume numbers need to be added later. Issue numbers and continuous volume pagination seem to be a phase-out model, but will not go away overnight, and might be maintained by a minority of journals for the foreseeable future. Therefore, it is important to clarify the status of early online publications.

While I would suggest following the publishers' 'Code' in defining what a preliminary version and the version of record are, only a Declaration of the Commission or the inclusion in the next Code's Glossary can make this definition mandatory.

I propose the following formal definition of 'preliminary version', 'Version of Record', and 'content of a publication', for inclusion in the Glossary of the Code':

Preliminary version of a publication. Any version of a publication that precedes the fixed *Version of Record* in the publication process. Preliminary versions are unavailable for nomenclatural purposes.

Version of Record. The final version of a publication that has immutable content and layout and will be archived (this excludes electronic supplements that are not part of the archived work itself). Bibliographical details, such as page numbering, issue and volume number, of a *Version of Record* can change or be added, e.g. if it gets included into a journal issue after publication.

Content of a publication. All components of a scientific paper (e.g. text, visuals) apart from bibliographic metadata (volume number, issue number, page numbering).

I strongly advise against adopting Dubois et al.'s (2015) proposed definition of the 'preliminary version of a publication' which does not distinguish between content and bibliographical metadata. It requires that 'even [the change of] a single-letter of a single modified element of layout' makes the *Version of Record* a preliminary version, hence unavailable for the purposes of zoological nomenclature. This definition, if applied to bibliographical metadata, does not fit into current publication models and would result in taxonomic papers being delayed until the publication of a print version, rendering journals with a print version less attractive as outlets for taxonomic research. This unpleasant scenario is entirely unnecessary and easy to avoid. By following the publishers' 'Code', namely the NISO guidelines, we can smoothly adapt to the world of electronic publishing.

Epilogue: Liberality suggested

Electronic publications as an available medium for zoological nomenclature are new and fast developing. Authors, publishers and the zoological Code will need some time to learn and adapt to the new and still rapidly evolving situation. We are currently in a transitional period, moving towards better adapted and functioning rules in the next edition of the Code. In this transitional period, we should interpret the existing rules rather pragmatically and liberally. While we should not allow deliberate neglect of sensible mandatory regulations, we should not interpret the Code and the Amendment in such a way that minor honest mistakes become blown up to major problems or that cannot be corrected in a sensible way.

Acknowledgements

Early in the discussion, Debbie Wright (*formerly of Wiley-Blackwell*) pointed out the relevance of the NISO Recommendation. Elizabeth Moylan (*BMC, London, U.K.*), Jennifer Boyd and Adrienne Loggins (*Oxford Journals, Oxford, U.K. and Cary, NC, U.S.A.*), Anne Harvey (*Cambridge University Press, Cambridge, U.K.*), Michiel Thijssen (*Brill, Leiden, The Netherlands*), Lyubomir Penev (*Pensoft Publishers, Sofia, Bulgaria*) and Zhi-Qiang Zhang (*Chief Editor and founder of Zootaxa*) helped to clarify their respective publishing policies. I am deeply indebted to Alain Dubois (*Muséum national d'histoire naturelle, Paris*) for his permission to refer to his at the time unpublished manuscript (Dubois, 2015) while he did not have the same opportunity with my paper as I completed it too late for his consideration. Reviews by David Bettman (*Denver Museum of Nature & Science*), Thomas Pape (*Natural History Museum of Denmark, Copenhagen*), Miguel Alonso-Zarazaga (*Museo Nacional de Ciencias Naturales, Madrid, Spain*) and by an anonymous referee greatly improved this paper.

References

- Al khatib, F., Fusu, L., Cruaud, A., Gibson, G., Borowiec, N., Rasplus, J.-Y., Ris, N. & Delvare, G. 2014. An integrative approach to species discrimination in the *Eupelmus urozonus* complex (Hymenoptera, Eupelmidae), with the description of 11 new species from the Western Palaearctic. *Systematic Entomology*, **39**: 806–862.

- Anderton, S. & Harvey, L.** 2013. Continuous publication: ready, set, cite! *British Journal of Radiology*, **86**: 20130252.
- Anonymous.** 2011. ICZN meeting on electronic publication. *Bulletin of Zoological Nomenclature*, **68**: 246–247.
- Anonymous.** 2014. Retraction. *Nordic Journal of Botany*, **32**: 128. [The electronic version contains the retracted article, Mattapha et al., 2013, as a supplement.]
- Carpenter, T.** 2006. Standards column — toward a terminology of journal article versions. *Against the Grain*, **18**(6): 79–80.
- Cirasella, J. & Bowdoin, S.** 2013. Just roll with it? Rolling volumes vs. discrete issues in open access library and information science journals. *Journal of Librarianship and Scholarly Communication*, **1**(4): ep1086.
- Cranston, P.S., Krell, F.-T., Walker, K. & Hewes, D.** 2015. Wiley's EarlyView constitutes valid publication for date-sensitive nomenclature. *Systematic Entomology*, **40**: 2–4.
- Dubois, A., Crochet, P.-A., Dickinson, E. C., Nemésio, A., Aesch, E., Bauer, A. M., Blagoderov, V., Bour, R., de Carvalho, M. R., Desutter-Grandcolas, L., Frétey, T., Jäger, P., Koyamba, V., Lavilla, E. O., Löbl, I., Louchart, A., Malécot, V., Schatz, H. & Ohler, A.** 2013. Nomenclatural and taxonomic problems related to the electronic publication of new nomina and nomenclatural acts in zoology, with brief comments on optical discs and on the situation in botany. *Zootaxa*, **3735**: 1–94.
- Dubois, A., Bour, R. & Ohler, A.** 2015. What is an online 'preliminary version' of a publication in the meaning of Article 9.9 of the Code?—One more step on the trail of the Asian elephant. *Bulletin of Zoological Nomenclature*, **72**: 6–18.
- Duriez, H.** 2013. 350 years at the cutting edge of scientific publishing – the Royal Society moves to continuous publication. *Insights*, **26**: 190–197.
- Erwin, T., Penev, L., Stoev, P. & Georgiev, T.** 2012. Accelerating innovative publishing in taxonomy and systematic: 250 issues of ZooKeys. *ZooKeys*, **251**: 1–10.
- Frankel, M.S., Elliott, R., Blume, M., Bourgois, J.-M., Hugenholtz, B., Lindquist, M.G., Morris, S. & Sandewall, E.** 2000. Defining and certifying electronic publication in science. *Learned Publishing*, **13**: 251–258.
- Frost, D.** 2014. Scientific nomenclature as applied in Amphibian Species of the World. <http://research.amnh.org/vz/herpetology/amphibia/Scientific-Nomenclature> [accessed 2 February 2015]
- ICZN (International Commission on Zoological Nomenclature).** 1999. *International Code of Zoological Nomenclature. Fourth Edition.* xxix, 306 pp. International Trust for Zoological Nomenclature, London.
- ICZN (International Commission on Zoological Nomenclature).** 2012. Amendment of Articles 8, 9, 10, 21 and 78 of the International Code of Zoological Nomenclature to expand and refine methods of publication. *Bulletin of Zoological Nomenclature*, **69**: 161–169.
- ICZN (International Commission on Zoological Nomenclature).** 2014. Zoological Nomenclature and Electronic Publication—a reply to Dubois et al. (2013). *Zootaxa*, **3779**: 3–5.
- Krell, F.-T.** 2013. Open-access journals are now open for discoveries of new plants and animals. *European Science Editing*, **39**: 11–12.
- Langer, M.C., Rincón, A.D., Ramezani, J., Solórzano, A. & Rauhut, O.W.M.** 2014a. New dinosaur (Theropoda, *stem-Averostra*) from the earliest Jurassic of the La Quinta formation, Venezuelan Andes. *Royal Society Open Science*, **1**: 140184, 15 pp.
- Langer, M.C., Rincón, A.D., Ramezani, J., Solórzano, A. & Rauhut, O.W.M.** 2014b. Addendum to 'New dinosaur (Theropoda, *stem-Averostra*) from the earliest Jurassic of the La Quinta formation, Venezuelan Andes'. *Royal Society Open Science*, **1**: 140527, 2 pp.
- Mattapha, S., Chantaranothai, P. & Suddee, S.** 2013. *Bauhinia saksuwaniae* sp. nov. (Leguminosae-Caesalpinioideae) from Thailand. *Nordic Journal of Botany*, online. doi: 10.1111/j.1756–1051.2013.00102.x; retracted, but available at <http://onlinelibrary.wiley.com/doi/10.1111/j.1756–1051.2013.00102.x/pdf> and https://www.researchgate.net/publication/259551468_Bauhinia_saksuwaniae_sp._nov._%28LeguminosaeCaesalpinioideae%29_from_Thailand [accessed 2 February, 2015]

- Minelli, A.** 2003. The status of taxonomic literature. *Trends in Ecology and Evolution*, **10**: 75–76.
- Morgan, C.** 2008. Journal article version nomenclature: the NISO/ALPSP recommendations. *Learned Publishing*, **21**: 273–277.
- Mosley, P.A.** 2011. Rethinking errata in the online journal model. *Library Leadership & Management*, **26**(2): 1–3.
- NISO/ALPSP Journal Article Versions (JAV) Technical Working Group** 2008. *Journal Article Versions (JAV): Recommendations of the NISO/ALPSP JAV Technical Working Group*. National Information Standards Organization, Baltimore, MD.
- Öchsner, A.** 2013. *Introduction to scientific publishing. Backgrounds, concepts, strategies*. Heidelberg: Springer.
- Rosenberg, G., Krell, F.-T. & Pyle, R.** 2012. Call to register species in ZooBank. *Nature*, **491**: 40.
- Thatje, S.** 2014. Moving forward: change of journal title and continuous article publishing. *Naturwissenschaften*, **101**: 1007–1008.
- Williams, P., Nicholas, D. & Rowlands, I.** 2010. E-journal usage and impact in scholarly research: a review of the literature. *New Review of Academic Librarianship*, **16**: 192–207.
- Zhang, Z.-Q.** 2006. The making of a mega-journal in taxonomy. *Zootaxa*, **1385**: 67–68.
- Zhang, Z.-Q.** 2014. Sustaining the development of world's foremost journal in biodiversity discovery and inventory: Zootaxa editors and their contributions. *Zootaxa*, **3753**: 597–600.